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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,110	09/09/2003	Hans David Hoeg	04413-P0005A	9223

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EXAMINER

SMITH, PHILIP ROBERT

ART UNIT	PAPER NUMBER
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3739

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/657,110	Applicant(s) HOEG ET AL.	
	Examiner Philip R. Smith	Art Unit 3739	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

- [01] A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/6/07 has been entered.

Drawings

- [02] The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "set of endoscope tip positions for which there is a direct line of sight to the target point" must be shown or the feature(s) canceled from the claim(s). Claim 20 recites the "display" of such a set. There is no illustration in the Figures. No new matter should be entered.
- [03] Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be

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labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

[04] The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

[05] Claims 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen (6,702,736) in view of Fukunaga (6,346,940).

[06] With regard to claim 14:

[06a] Chen discloses a method for improving a medical procedure; comprising:

- providing an endoscope ("endoscope 90" 4/48) with a longitudinal axis and a variable view vector (see Figure 11);
- positioning the endoscope relative to anatomical structure to acquire images of the structure;
- providing a first display of the images acquired by the endoscope ("video image data 210 obtained from endoscope 90" 9/25);
- providing a second display of a graphical model of the anatomical structure ("computer model image data 220" 9/26) simultaneously with the first display of the images of the anatomical structure acquired by the endoscope ("composite image 200" 9/24), wherein the graphical model is reconstructed from volumetric scan data of the anatomical structure ("anatomical 3-D computer models 160" 8/24);

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- acquiring position data of the endoscope relative to the anatomical structure ("tracking system 97" 3-19).
- acquiring configuration data of the orientation of the view vector relative to the longitudinal axis of the endoscope ("angle of inclination" illustrated in Fig.11);
- displaying a graphical representation of the endoscope relative to the anatomical structure based on the position data and the volumetric scan data (see Figure 9 with reference to (10/35-41);

[06b] Chen does not disclose:

- displaying a graphical representation of the endoscope in the second display;
- displaying in the second display a graphical representation of the view vector relative the longitudinal axis of the endoscope based on the configuration data.

[06c] Fukunaga discloses:

- providing a first display of the images acquired by an endoscope ("main display 11a which displays an endoscopic image Ai" 5/54);
- displaying in a second display a graphical model of an anatomical structure ("subdisplay 11b which displays an outer shape image Bi" 5/55)
- displaying in the second display a graphical representation of the endoscope relative to the anatomical structure based on the position data and the volumetric scan data ("indicator image Ci" 8/61-67)
- displaying in the second display a graphical representation of the view vector ("red bar 37" 8/63) relative the longitudinal axis of the endoscope based on the configuration data.

- [06d] At the time of the invention, it would have been obvious to a person of ordinary skill in the art that to combine anatomic visualization system disclosed by Chen with the graphical representation of an endoscope relative to an anatomical structure as disclosed by Fukunaga. It is obvious to combine prior art elements according to known methods to yield predictable results. In combination, the anatomic visualization system and the graphical representation of an endoscope would have performed the same function as they had separately; a skilled artisan would have recognized that the result of the combination was predictable.
- [07] With regard to claim 15: As noted above, Fukunaga discloses displaying on the second display a graphical representation of the endoscopic view vector. Chen discloses a cone surrounding the view vector based on known "optical properties" of the endoscope (see Figure 11). A view cone, in addition to the vector disclosed by Fukunaga would offer the obvious advantage of borders of the displayed portion (see "software object 90B" in Figure 4).
- [08] With regard to claim 16: Fukunaga further discloses displaying on the second display a marker that indicates the up direction of the images acquired by the endoscope ("green hemisphere 35... indicates the reference direction" 8/65-67).
- [09] With regard to claim 17: As noted above, Chen in view of Fukunaga discloses first and second displays are displayed on a single monitor. It would have been obvious to display them on first and second monitors, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ. Constructing two monitors having a single display each instead of a single monitor having two displays is essentially equivalent and well within the abilities of a skilled artisan.

- [10] With regard to claim 19: Chen further discloses selecting a target point relative to the reconstructed anatomical structure ("markers 30E" 11/45); and calculating a set of endoscope tip positions from which there is a direct line of sight to the target point. In the course of rendering target points within the first and second displays, Chen inherently calculates an endoscope tip position from which there is a direct line of sight to the target point (as in Figure 12). Given that the target point will be rendered from any vantage point having a direct line of sight to the target point, there will inherently be a set of endoscope tip positions which is calculated in the normal course of use.
- [11] With regard to claim 20: Chen in view of Fukunaga inherently displays a set of endoscope tip positions for which there is a direct line of sight to the target point (see Figure 12).
- [12] With regard to claim 21: Chen in view of Fukunaga further discloses: selecting an entry path for the endoscope ("plan a surgical procedure" 11/46); calculating which of the endoscope tip positions for which there is a direct line of sight to the target point are intersected by the entry path (see Figure 12); and displaying the endoscope tip positions that are intersected by the entry path (see Figure 12).

Additional Claim Rejections - 35 USC § 103

- [13] Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen (6,702,736) in view of Fukunaga (6,346,940) and in further view of Schulz (5,920,395).
- [14] Chen discloses that "tracking system 97 might comprise an optical tracking system" (5/26-27). Chen does not disclose that "tracking system 97" particularly comprises a plurality of cameras to track light emitting diodes on the endoscope.
- [15] Schulz discloses that "[t]hree light sensors 20, 22, and 24 sense the light projected by the individual light emitters 14, 16 and generate electrical output signals from which are derived the location of the

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probe 12 and, consequently, the probe tip 18, with respect to the fixed coordinate system 80" (5/30-35). Schulz further discloses that the light emitter may be LEDs (7/10).

- [16] At the time of the invention, it would have been obvious to a person of ordinary skill in the art that the optical tracking system disclosed by Schulz be substituted for the optical tracking system disclosed by Chen. It is obvious to substitute one known element for another to obtain predictable results. Optical tracking systems are known in the art, as are camera/LED optical tracking systems. A skilled artisan could have substituted one for the other, and the resulting substitution would have been predictable.

Conclusion

- [17] Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip R. Smith whose telephone number is (571) 272 6087 and whose email address is philip.smith@uspto.gov. The examiner can normally be reached between 9:00am and 5:00pm.
- [18] If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Linda Dvorak can be reached on (571) 272 4764.
- [19] Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



/John P. Leubecker/
Primary Examiner, AU 3739